



**THE UNITED STATES PATENT AND TRADEMARK OFFICE**

In re Application of: Ma et al.

Serial No.: 10/005,586 Examiner: To be assigned

Filed: October 29, 2001 Art Unit: To be assigned

For: **MODIFIED CARBIDE AND OXYCARBIDE CONTAINING  
CATALYSTS AND METHODS OF MAKING AND USING THE  
SAME**

**CERTIFICATE OF MAILING**

I hereby certify that this correspondence is being deposited on 1/7/02,  
with the United States Postal Service as First Class Mail in an envelope  
addressed to: Commissioner for Patents, Washington, D.C. 20231.

Signature: John W. Kung

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**INFORMATION DISCLOSURE STATEMENT**

Commissioner for Patents  
Washington, D.C. 20231

Sir:

In fulfillment of the requirements of candor and good faith set forth in 37 C.F.R. § 1.56,  
applicants submit herewith the following Information Disclosure Statement in accordance with  
the provisions of 37 C.F.R. § 1.97 and 1.98.

**I. U.S. PATENTS**

1. \*U.S. Patent No. 4,271,041 issued June 2, 1981 to Boudart et al.
2. \*U.S. Patent No. 4,663,230 issued May 5, 1987 to Tennent et al.
3. \*U.S. Patent No. 4,855,091 issued August 8, 1989 to Geus.
4. U.S. Patent No. 5,110,693 issued May 5, 1992 to Friend et al.
5. \*U.S. Patent No. 5,139,987 issued August 18, 1992 to Ledoux et al.
6. \*U.S. Patent No. 5,165,909 issued November 24, 1992 to Tennent.

7. \*U.S. Patent No. 5,171,560 issued December 15, 1992 to Tennent et al.
8. \*U.S. Patent No. 5,196,389 issued March 23, 1993 to Dubots.
9. \*U.S. Patent No. 5,217,930 issued June 8, 1993 to Dubots.
10. \*U.S. Patent No. 5,308,597 issued May 3, 1994 to Ledoux et al.
11. \*U.S. Patent No. 5,384,027 issued January 24, 1995 to Sherif.
12. \*U.S. Patent No. 5,391,524 issued February 21, 1995 to Ledoux et al.
13. \*U.S. Patent No. 5,451,389 issued September 19, 1995 to Sherif.
14. \*U.S. Patent No. 5,456,897 issued October 10, 1995 to Moy et al.
15. \*U.S. Patent No. 5,468,370 issued November 21, 1995 to Ledoux et al.
16. U.S. Patent No. 5,500,200 issued March 19, 1996 to Mandeville et al.
17. U.S. Patent No. 5,569,635 issued October 29, 1996 to Moy et al.
18. \*U.S. Patent No. 5,576,466 issued November 19, 1996 to Ledoux et al.
19. \*U.S. Patent No. 5,618,510 issued April 8, 1997 to Okada et al.
20. \*U.S. Patent No. 5,676,918 issued October 14, 1997 to Okada et al.
21. U.S. Patent No. 5,707,916 issued January 13, 1998 to Snyder et al.
22. \*U.S. Patent No. 5,866,434 issued February 2, 1999 to Massey et al.
23. U.S. Patent No. 5,877,110 issued March 2, 1999 to Snyder et al.
24. \*U.S. Patent No. 5,897,945 issued April 27, 1999 to Lieber et al.
25. U.S. Patent No. 5,965,470 issued October 12, 1999 to Bening et al.
26. U.S. Patent No. 6,031,711 issued February 29, 2000 to Tennent et al.
27. U.S. Patent No. 6,090,992 issued July 18, 2000 to Wu et al.
28. U.S. Patent No. 6,099,965 issued August 8, 2000 to Tennent et al.
29. U.S. Patent No. 6,110,859 issued August 29, 2000 to Wu et al.

30. U.S. Patent No. 6,143,689 issued November 7, 2000 to Moy et al.
31. U.S. Patent No. 6,203,814 issued March 23, 2001 to Fisher et al.

## **II. U.S. PATENT APPLICATIONS**

1. U.S. Serial No. 08/329,774 filed October 27, 1984 to Bening et al.
2. U.S. Serial No. 08/414,369 filed March 31, 1995 to Moy et al.
3. U.S. Serial No. 08/447,501 filed May 23, 1995 to Moy et al.
4. U.S. Serial No. 08/456,659 filed June 2, 1995 to Moy et al.

## **III. PUBLICATIONS**

1. \*Baker and Harris, Chemistry and Physics of Carbon, Walker and Thrower ed., Vol. 14, p. 83, (1978).
2. \*Rodriguez, N., J. Mater. Research, Vol. 8, p. 3233 (1993).
3. \*Oberlin, A. and Endo, M., J. of Crystal Growth, Vol. 32 (1976), pp. 335-349.
4. \*McCarthy and Bening (Polymer Preprints ACS Div. Of Polymer Chem. 30(1) 420 (1990).
5. \*Iijima, Nature, 354, 56 (1991).
6. \*Weaver, Science, 165 (1994).
7. \*C. Pham-Huu, et al., "Reactions of *n*-Heptane and Methylcyclopentane over an Oxygen-Modified Molybdenum Carbide Catalyst. Study of Coke Formation, Catalyst Deactivation and Regeneration", Ind. Eng. Chem. Res. 34, 1107-1113 (1995).
8. \*Golodets, G.I. & Ross, J.R.H., "Heterogeneous Catalytic Reactions Involving Molecular Oxygen", Studies in Surface Science, 15, Elsevier Press, NYC 1983.
9. \*Ledoux, M. et al., "Characterization of a Catalytically Active Molybdenum Oxycarbide", Mat. Res. Soc. Symp Proc., Vol. 368, 57-67 (1995).
10. \*Iglesia, E., et al., "Bifunctional Reactions of Alkanes on Tungsten Carbides Modified by Chemisorbed Oxygen", Journal of Catalysis, 131, 523-544 (1991).

11. \*Ribeiro, F. et al., "Reactions of Neopentane, Methylcyclohexane, and 3,3-Dimethylpentane on Tungsten Carbides: The Effect of Surface Oxygen on Reaction Pathways", Journal of Catalysis, 130, 86-105 (1991).
12. \*Ribeiro, F. et al., "Catalytic Reactions of *n*-Alkanes on  $\beta$ -W<sub>2</sub>C and WC: The Effect of Surface Oxygen on Reaction Pathways", Journal of Catalysis, 130, 498-513 (1991).
13. \*Ledoux, M., et al., "New Synthesis and Uses of High-Specific-Surface SiC as a Catalytic Support that is Chemically Inert and Has High Thermal Resistance", Journal of Catalysis, 114, 176-185 (1988).
14. \*Pham-Huu, C., et al., "Reactions of 2- and 3-Methylpentane, Methylcyclopentane, Cyclopentane, and Cyclohexane on Activated Mo<sub>2</sub>C", Journal of Catalysis, 143, 249-261 (1993).

#### **IV. FOREIGN PATENT PUBLICATIONS**

1. \*PCT/US/94/10168 filed September 9, 1994 to Ikeda et al.
2. \*WO 89/07163 filed January 28, 1989 to Snyder et al.
3. \*WO 91/05089 filed September 27, 1990 to Friend et al.
4. \*European Patent Application No. 0396 475 A1 (1989).
5. \*WO 96/41043 issued December 19, 1996 to Lieber et al.
6. \*EPO 0 511 919 A1 filed April 27, 1992 to D. Dubots et al.
7. \*EPO 0 474 570 A1 filed September 4, 1991 to M. Ledoux, et al.
8. \*EPO 0 396 475 A1 filed March 26, 1990 to M. Ledoux et al.
9. \*EPO 0 534 867 A1 filed September 4, 1992 to M. Ledoux et al.
10. \*EPO 0 440 569 A2 filed January 28, 1991 to D. Dubots et al.

This Information Disclosure Statement is not a representation that the documents cited herein are considered most pertinent, or that a search has been undertaken, or that any of the cited documents is indeed prior art. The Examiner is invited to undertake an independent search.

The present application is a 37 C.F.R. 1.53(b) continuation-in-part of Serial Application No. 09/481,184 filed January 12, 2000 and Serial Application No. 09/615,350 filed July 12, 2000

(the "Parent Applications") and relies upon the Parent Applications for an earlier filing date.

Pursuant to Rule 37 C.F.R. 1.98(d), no copies of the references marked by asterisks are provided because they were previously submitted with the Parent Applications.

U.S. Serial Application No. 08/329,774 shares the same specification as U.S. Patent No. 5,965,470 which is provided herewith. Accordingly, a copy of U.S. Serial Application No. 08/329,774 is not provided. U.S. Serial Application No. 08/456,659 shares the same specification as U.S. Patent No. 5,456,897 which was previously submitted with the Parent Applications. Accordingly, a copy of U.S. Serial Application No. 08/456,659 is not provided.

Pursuant to Rule 37 C.F.R. 1.97(b), an Information Disclosure Statement shall be considered by the Patent Office if filed before the mailing date of the first Official Action on the merits. Accordingly, no fee is believed necessary for entry and consideration of this Information Disclosure Statement. However, the Commissioner is hereby authorized to charge any fee required or credit any overpayment in such fees to Deposit Account No. 50-0540.

Applicants respectfully request that the Examiner consider and make of record the documents cited herein. Applicants further request that a copy of Form PTO-1449, appropriately initialed by the Examiner, be returned to Applicants' attorney.

Dated: 1/7/02

Respectfully submitted,

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